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NATURAL HERITAGE NEWS

The Newsletter of the Natural Heritage & Endangered Species Program
Inventorying and Protecting the Biological Diversity of the Commonwealth Since 1978

VOLUME 1, NUMBER 1

MARCH 1991

Welcome to the first issue of Natural Heritage News. In appreciation of the generous support which we receive from concerned individuals and organizations throughout the state, we will be publishing a semi-annual newsletter. We will report on ongoing activities sponsored by the Program and discuss the inventory and scientific research we fund and promote. We will also describe some of our species and land protection efforts such as our activities in environmental review, public lands registry, and the nascent state Nature Preserve System. Species that are representative of the 402 species listed as being endangered, threatened, or of special concern here in the state will also be spotlighted. We hope that this newsletter will help our readers to gain a greater understanding of the species and habitats we are working to protect.

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Endangered Species Bill Passes

One of the most progressive endangered species protection laws in the nation has been enacted by the Massachusetts legislature after five years of intensive effort by a broad coalition of conservation organizations. Prior to the passage of this act, which was signed into law on Dec. 27, protections for endangered species under state law were grossly inadequate, archaic, and even nonexistent for many species.

Senate Bill #1768 was enacted by a 143 to 0 vote in the House of Representatives and by voice vote in the Senate. The new legislation gives the Division of Fisheries & Wildlife important new powers to protect endangered and threatened plants, animals and their habitats in the Commonwealth. According to Henry Woolsey, Coordinator of the Division's Natural Heritage & Endangered Species

Program who has been working on this bill for five years, its passage is "a major milestone for wildlife conservation in the Commonwealth".

The immediate impact of the bill is the creation of strong provisions against taking or selling rare plant and animal species. The most significant components of the new legislation are the habitat protections for endangered

Some Massachusetts Plants and Animals Protected Under the New Endangered Species Bill:



Regal Fritillary



Small Whorled Pogonia



Short-eared Owl



Hairy Honeysuckle



Upland Sandpiper

and threatened species. As is true elsewhere, habitat loss is the single greatest threat to our native plants and animals. The Division of Fisheries & Wildlife will be drafting regulations this year to implement the habitat protection provisions. After these regulations become effective, critical endangered species areas will be selected and designated as "significant habitat" on a case by case basis.

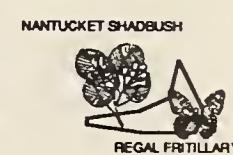
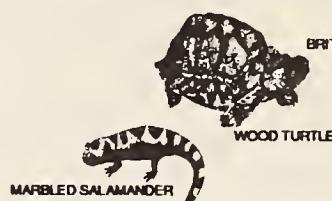
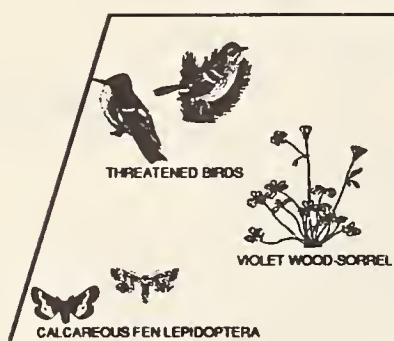
Other noteworthy aspects of the legislation are: the prohibition of taking or selling of any rare species except as authorized for scientific, educational, or captive propagation purposes, and fines ranging from \$1,000- \$20,000 and imprisonment for up to 180 days for wrongfully altering significant habitat.

Recent biological inventory and research by the Natural Heritage & Endangered Species Program has documented which species in Massachusetts are rare (see last page for listings). Twenty percent of Massachusetts' native vertebrate wildlife is on the Division's existing regulatory list of endangered, threatened, and special concern species. Seven species of birds and mammals that once occurred in the state are now extinct and seventy-two species of plants and animals have disappeared from the state in the last 150 years.

Massachusetts Division of Fisheries and Wildlife

100 Cambridge Street
Boston, MA 02202 (617) 727-9194

1990 SMALL RESEARCH CONTRACTS



251 Acres Acquired In 1990

Land protection for rare species and exemplary natural communities is one of the highest priorities for the Natural Heritage & Endangered Species Program. Towards this goal, 251 acres of significant habitat that support rare and endangered species were acquired by the Division of Fisheries and Wildlife in 1990. The Division now boasts 778 acres of habitat bought specifically to protect rare and endangered species habitat. Departmental lawyer Daane Crook facilitated the acquisitions and four of the 1990 transactions were negotiated on the Commonwealth's behalf by The Nature Conservancy. The following is a brief description of the land purchased under recommendation of the Program in fiscal year 1990:

Mashpee: 20 acres (2 tracts) of the only Pitch Pine/Scrub Oak Barrens in Mass. that contain Atlantic White Cedar swamps.

Plymouth: A 15 acre tract containing an outstanding example of a Coastal Plain Kettle Pond that harbors several rare plants, one of which is a candidate for federal listing.

Clinton: 42 acres of Black Oak Savanna. This tract borders the Nashua River and is adjacent to town conservation land.

Leverett: 90 acres of botanically rich, moist, hardwood forest on a steep slope. This tract is adjacent to Dept. of Environmental Management and town conservation lands.

West Stockbridge: 84 acres of botanically rich, moist, hardwood forest which harbors several rare plants.

Research Proposals Sought for Summer Field Season

Puritan Tiger Beetles, Piping Plovers, Marbled Salamanders, Britton's Violet, Wood Turtles, Nantucket Shadblush... All these and more were investigated and inventoried in 1990 with support from the Natural Heritage Program's Small Research Contracts funding. Each year the Program seeks proposals from professional biologists and amateur naturalists who wish to study our native species and natural communities. The Natural Heritage & Endangered Species Program is now accepting proposals for the coming field season. Please call Diane Lauber at (617)727-9194 for a copy of the 1991 Request for Proposals.

In 1990, eighteen contractors were awarded a total of \$22,221 under the Small Research Contracts arrangement. The following is a breakdown of the projects:

RESEARCH AND INVENTORY PROJECTS	FUNDING
6 Vertebrate Projects	\$4,472.00
7 Invertebrate Projects	\$7,551.00
4 Plant Projects	\$9,170.00
1 Natural Community Project	\$1,028.00

Connecticut River Valley and Deerfield River Inventory

Small Research Contracts Available

Through a cooperative arrangement with the Massachusetts Field Office of The Nature Conservancy, the Natural Heritage & Endangered Species Program will be able to fund intensive inventory and research projects in the Connecticut River Valley and along the Deerfield River in 1991. The Nature Conservancy received monies for natural area inventories as well as land acquisition in this geographical area due to a consent decree resulting from a water pollution lawsuit. Up to \$25,000 is available for field inventory and research projects in 1991.

Natural community surveys are the highest priority. Also important are censuses of rare mussels, especially *Alasmidonta heterodon*, *A. varicosa*, and *Lampsilis cariosa*, inventories of state-listed rare damselflies, tiger beetle and plant populations and surveys for rare species of moths in Pitch Pine/Scrub Oak habitats.

Advisory Committee Ponders Exotic Topics

Established formally in 1983 and continuing under the able chairmanship of Dr. Gwil Jones since that time, the Nongame Advisory Committee counsels the Division of Fisheries and Wildlife on a range of issues. Most recently the committee has been investigating the topic of exotic species in Massachusetts. These include non-native species in the state whose increasing presence threatens the status of native species. Purple Loosestrife, Gypsy Moth, and Rusty Crayfish are examples of such introduced species. The Committee meets on the second Thursday afternoon of each month at the Division's Field Headquarters in Westboro. The public is welcome to attend these meetings.

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Vice-Chair

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(Mass. Audubon Society)

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Mark Pokras
(Tufts University)

Recovery for Federally Endangered Beetle Launched in Massachusetts

Today there are only two populations of the American Burying Beetle (*Nicrophorus americanus*) in the United States but by this summer there may be three. Cooperative efforts between state, federal, and private conservation organizations have resulted in an experimental program to reintroduce this endangered beetle to a Massachusetts site where it once was found.



American Burying Beetle
(*Nicrophorus americanus*)

Illustration from Swan, Lester A. and Papp, Charles A., *The Common Insects of North America*. Harper & Row, 1972.

The American Burying Beetle is a carrion beetle; that is, it feeds and reproduces upon carrion. With a length of between 1 and 1.4 inches it is the largest species in its genus and it tends to utilize larger carrion than any other species in its genus. It also has very distinctive markings. On the back of its thorax *N. americanus* has a large orange-red spot. In addition, it has orange knobs on its antennae, the anterior portion of its head is red, and there are two pairs of red spots on its wing covers.

The life cycle of this beetle begins when a male and a female beetle excavate the earth under the carcass of a small bird or mammal; a process normally beginning shortly after dark and usually finishing before dawn.

Sometimes the carrion is moved laterally underground. The female then lays her eggs on the carrion and both parents remain with the eggs until the larvae emerge about 50 days later.

The American Burying Beetle was once widely distributed across the eastern United States but its numbers mysteriously began to decline about 40 years ago. There are various theories about why this range contracted so drastically but none are universally accepted. Recent inventory for this species produced only two populations: one of an uncertain number in Oklahoma and one estimated to have approximately 500 individuals on a New England island. When the U.S. Fish & Wildlife Service (USFWS) listed *N. americanus* as federally Endangered in 1989 the beetle was given the maximum protection available by federal law --- protection equal to that afforded the Bald Eagle and the Peregrine Falcon. This recognition has rarely been given to insects.

The federal recovery program for the American Burying Beetle includes possible re-establishment of the species at new sites. Thomas French, Director of the Natural Heritage & Endangered Species Program (NH&ESP), suggested that the beetle be reintroduced to a Massachusetts Division of Fisheries & Wildlife (DFW)-owned island which was known to have sustained a population of the beetles at one time. In July 1990 a contingent of staff from the DFW, The Nature Conservancy, the USFWS, and Boston University released 25 pairs of beetles at the new site. Each pair was placed with a carcass and then covered with a flower pot to prevent them from flying away. Twenty-four pairs successfully buried the carcasses. A preliminary survey found larvae on 65% of the 17 carcasses checked. We are awaiting this summer's inventory by the NH&ESP to determine whether a healthy new population of American Burying Beetles has been initially established.

Piping Plover Population Appears Stable

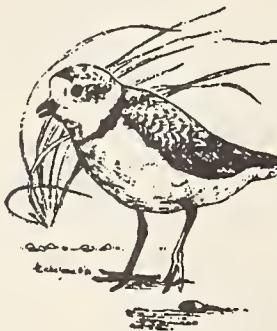
Efforts to protect the federally Threatened Piping Plover (*Charadrius melanotos*) in Massachusetts seem to have stabilized their numbers here over the past three years. During 1990 observers reported finding 139 breeding pairs

at 58 sites along the coast. These sites stretch from the North Shore to Buzzard's Bay. There were 137 pairs observed in 1989 and 134 pairs reported in 1988.

The Piping Plover is a small bird that feeds and nests on outer beaches. The adults, chicks, and eggs are all sand-colored and well-camouflaged for their coastal environment.

Their steady decline in numbers since the 1940's can be partially attributed to their effective camouflage: Piping Plovers can be difficult to see by foot or by shore vehicles, hence, they are sometimes crushed. Equally threatening to their survival is increased commercial and recreational development of the shore and the growing numbers of predators that such development attracts.

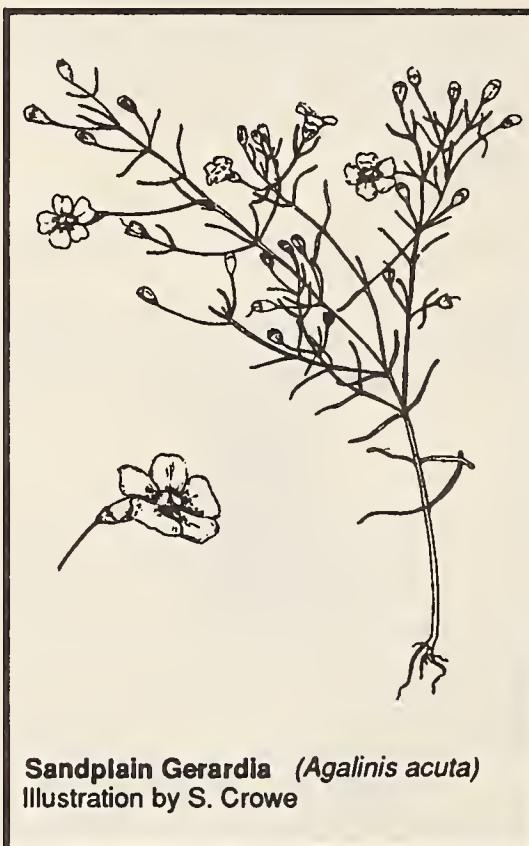
The U.S. Fish & Wildlife Service, the National Park Service, the Natural Heritage & Endangered Species Program, and various environmental groups have united over the past few years to reduce the environmental disturbances which affect the Piping Plover. These efforts at protection normally include building small enclosures around the nesting sites to discourage predators and seasonally closing parts of some beaches to the public to lessen human disturbance. It is hoped that the efforts of so many individuals and organizations will eventually help to increase the numbers of Piping Plovers -- one of the more widely appreciated species in the state.



Piping Plover (*Charadrius melanotos*)
Illustration by J. Zickefoose, 1986

Return of the Native: *Agalinis acuta* Has Prolific Summer

Sandplain Gerardia (*Agalinis acuta*) is a delicate, sparsely branched light green herb which normally grows to be 5-10 inches tall. Its bell-shaped, pink-purple flowers are streaked with two cream colored lines and purple spots on the white corolla throat.



Sandplain Gerardia (*Agalinis acuta*)
Illustration by S. Crowe

As is true with many plants in the genus, the Sandplain Gerardia is a hemiparasite. In the early stages of growth it obtains supplemental nutrition by attaching its roots to a surrounding plant, such as little blue-stem grass. Later, the contact between the two plants breaks.

In 1980 staff members from the fledgling Natural Heritage & Endangered Species Program were beginning to carry out the first recent systematic censuses of endangered plants and non-game wildlife in Massachusetts. When Bruce Sorrie, then as now Program Botanist, discovered a population of Sandplain Gerardia on Cape Cod, it was the first time that this rare species had been reported in Massachusetts since 1944. Bruce subsequently found another population nearby and these remain the only two populations of Sandplain Gerardia known in the state. In an effort to encourage this species,

Bruce and staff from The Nature Conservancy have a management agreement with the owners of the land that support *A. acuta* populations.

Since Sandplain Gerardia is an annual plant its populations have varied widely over the past ten years. In the 1980's one group had just seven plants, though now it numbers over 100 plants. The second population reached a record 1,000 plants during the past summer. Still, as an annual plant, its future is by no means assured.

Happily, *A. acuta* has been rediscovered in all the states in which it was historically known: Massachusetts, Rhode Island, Connecticut, and New York. In addition, there are recorded occurrences of it in Maryland. This rare plant is one of only two Massachusetts plant species which are listed under the federal Endangered Species Act.

RAPTOR UPDATE

Since 1982 forty-one Bald Eagle chicks have been reared and released in Massachusetts by the Division of Fisheries & Wildlife. Bald Eagles have now nested in the state for two consecutive years. Of the five pairs that nested here last year, three pairs produced four chicks which fledged successfully.



The nesting pair of Peregrine Falcons in Boston's Custom House tower successfully raised three chicks in 1990. This pair has produced 12 chicks in 4 years.



The nesting pair of Peregrine Falcons which settled in Springfield was featured on a local cable T.V. network on a 24 hour-a-day basis during the nesting period. Over 200,000 cable subscribers could view this pair, making them the most publicly visible Peregrines in North America.

Fund Contributions Top \$400,000 in 1989

Thanks to generous support from contributors, 1989 was a very good year for the Natural Heritage & Endangered Species Fund (formerly known as the Nongame Wildlife Fund). Over 75,000 Massachusetts taxpayers donated approximately \$406,000 by filling in the voluntary contribution line on their state income tax forms. Our record year, however, remains 1986 when taxpayers donated \$418,361. The Fund first appeared on state tax forms in 1983 and now accounts for 84% of the Program's annual operating budget.

Sportsmen's license fees account for the remaining 16% of the budget. Contributions from tax forms are deposited directly into the Fund, as is interest on the principal in the Fund.

With the 1990 filing year, Massachusetts became one of three states with voluntary contribution lines on corporate income tax forms. The roughly 100,000 corporations that file income tax forms in Massachusetts are now able to donate to the Fund on their tax forms. An incomplete figure of corporate contributions, based on roughly half of the expected returns, is a very modest \$97.00.

Taxpayers can donate to the Fund on this year's tax forms simply by adding a contribution to the tax due or deducting from a refund. All contributions are tax deductible on federal tax returns.



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NEWS NOTES



106 vernal pools were certified by the Program during the past year, bringing the total number of certified vernal pools in the state to 165. These ephemeral, springtime pools offer amphibians critical breeding environments. The Program commends concerned individuals, such as those in the town of Westford, who have been very active in documenting and inventorying these small yet crucial habitats. Certification provides the pools protection only if they occur in an area under the jurisdiction of the Wetlands Protection Act.



Twice in 1990 Pat Swain (Program Ecologist), Annie Woolsey (Program Protection Planner), and the DFW's Dick Turner led groups of Program staff and local volunteers to a pond on Cape Cod. At this pond fast-growing Giant Reed-Grass (*Phragmites australis*) is overtaking the shoreline which supports the endangered Creeping St. John's-wort (*Hypericum adpressum*). In an effort to curtail growth, the *Phragmites* plants were cut back on each visit. Development of Giant Reed Grass is severely restricted by cutting it back at appropriate times in its flowering and fruiting cycle, but this process must be continued for several years if it is to be successful.



Twelve changes to the state's official rare wildlife species list were approved in December, 1989. Three species were added, two species were delisted (most significantly the osprey), and the endangerment status of seven taxa on the list was changed. Rare plant list changes were incorporated in May, 1989.

PUBLICATIONS

The 1991 edition of The Atlas of Estimated Habitats of State Listed Rare Wetlands Wildlife is now available. Call the Program office for order forms.



The Program office produces "fact sheets" on many listed species and on some natural communities in Massachusetts. Species fact sheets normally include an illustration, a brief description of the species and its behavior, a note on its range, and its population status. Natural community fact sheets describe a specific area's vegetation cover and examples of the listed species which may be found there. We provide limited quantities of these publications free to the public.



This year's promotional poster is now available free to the public. The poster, on the osprey's recovery, features the slogan "You helped save some local fishermen by giving them old wooden poles" with a color photograph of ospreys.

Save something on your taxes! Contributions to the NH&ES Fund are usually made on state income tax forms and are deductible on federal tax forms. Or, you can donate directly to the Fund with a personal check. Please accept my contribution of \$ _____. Please make checks payable to "Natural Heritage & Endangered Species Fund".

1991 STATE BOX SCORE
Massachusetts Listed Species: Endangered, Threatened and
Special Concern Native Plants and Animals
(as listed in 321 CMR 8:00, March 1990)

Taxonomic Group	Endangered	Threatened	Special Concern	Listed Total	% of State's Total Native Population That is Listed
Mammals (including marine)	7 (7 Federal)	0	5	12	14%
Birds (breeding species, except for the Eskimo Curlew)	11 (4 Federal)	6 (1 Federal)	13	30	14
Reptiles (including marine turtles)	7 (4 Federal)	4 (2 Federal)	3	14	47
Amphibians	0	2	4	6	29
Fish (inland species only)	4 (1 Federal)	2	3	9	23
Invertebrates (non-marine only)	20 (2 Federal)	16 (2 Federal)	54	90	N/A
Vascular Plants	106 (2 Federal)	80	55	241	14
TOTALS	155 (20 Federal)	110 (5 Federal)	137	402	15*

* Total percentage has been computed excluding invertebrates since even a rough number of native invertebrate species in the state is unknown.
Federal : Massachusetts species also listed by the U.S. Fish & Wildlife Service, as of Sept. 1990, as Federally Endangered or Threatened. Eleven of these species are whales and sea turtles.

NH&ES PROGRAM STAFF:

Thomas French Assistant Director of Natural Heritage & Endangered Species
Henry Woolsey Coordinator, Natural Heritage & Endangered Species Program
Brad Blodget State Ornithologist (Westboro Office)
Jay Copeland Environmental Reviewer
Bill Davis Eagle Project Leader (Westboro Office)
Meg Goodwin Manager of Information Systems
Diane Lauber Secretary
Scott Melvin Rare Species Zoologist (Westboro Office)
Steven Roble Wetlands Wildlife Biologist
Bruce Sorrie State Botanist
Patricia Swain Natural Community Ecologist
Annie Woolsey Protection Planner

The Program also relies upon interns, volunteers, and work-study students for crucial assistance:

Robyn Binder Volunteer, Botanical Fact Sheets
Matt Bertrand Intern, Animal Fact Sheets
Christine Dugan Volunteer, Newsletter Writer/Editor
Gretchen Eliason Intern, Assistant Data Manager
Danny Gee Work-study, Data Management
Cellna Harshman Work-study, Environmental Review
Diane Lazinsky Intern, Rare Wetlands Wildlife
Tricia Mansfield Volunteer, Vernal Pools
Christina Quinchia Work-study, Data Management
Margo Schulze Intern, Vernal Pool Mapping
Elizabeth Szatmari Work-study, Data Management
Sara White Volunteer, Data Management

We wish to thank Dave Gabriel, DFW Graphic Artist, for his technical support in the production of this newsletter.

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NATIONAL HERITAGE & ENDANGERED SPECIES PROGRAM
DIVISION OF FISHERIES & WILDLIFE
100 CAMBRIDGE STREET
BOSTON, MA 02202



NATURAL HERITAGE NEWS

The Newsletter of the Natural Heritage & Endangered Species Program
Inventorying and Protecting the Biological Diversity of the Commonwealth Since 1978

VOLUME 1, NUMBER 2

FALL 1991

Comprehensive new endangered species regulations are now undergoing final review and approval before being slated for adoption in late December. These regulations will implement Massachusetts' Endangered Species Act that was passed in December 1990.

The regulations are divided into four parts: Part I covers the listing of species, taking and possession of listed species, as well as penalties for violations. Parts II & III concern the designation and alteration, respectively, of Significant Habitats for Endangered and Threatened species. Part IV lists all Endangered, Threatened and Special concern plants and animals and includes the forms necessary to seek a permit for altering designated Significant Habitat areas. Since the statute itself went into considerable detail concerning the workings of this act, the regulations largely clarify and fill out the statutory

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1991 FIELD SEASON

Staff Discoveries

- Thomas French discovered, on Mt. Greylock, the first Pygmy Shrew (*Sorex hoyi*) ever documented in the state. Its length of 2 to 2.5 inches and weight of 3 to 4 grams probably makes this the country's smallest mammal. It is also evidence of Dr. French's propensity for finding small animals in discarded bottles. (The sides of bottles become slick due to collected rain water and animals cannot escape.)
- Steven Roble and Research Associate Ralph Charlton independently rediscovered the Arrow Clubtail dragonfly (*Stylurus spiniceps*) at sites along the Connecticut River. This species had not been found in the state for 75 years. Dr. Roble also found the only adult Zebra Clubtail (*Stylurus scudderi*) ever documented in the state and reconfirmed (after a lapse of 102 years) one of only three known state populations of the Ocellated Darner dragonfly (*Boyeria grafiana*).
- Bruce Sorrie's field work in Sheffield led him to the state's first verified native population of Hispid Pennyroyal (*Hedeoma hispida*). Previous records had not conclusively shown this to be a native species. He also found the state's second population of the Endangered Drooping Speargrass (*Poa languida*) and the state's second and third populations of the Threatened Shining Wedgegrass (*Sphenopholis nitida*).
- A DFW press release requesting information on Wild Lupine (*Lupinus perennis*) and Patricia Swain's WBZ-TV interview on the subject elicited 14 responses from the public. These will help us to determine the status of this "watch list" species and the availability of habitat for the now extirpated Karner Blue Butterfly whose caterpillars feed exclusively on Wild Lupine.

Small Research Contracts

We are always fortunate in obtaining valuable results from those working under our Small Research Contracts program. This summer's efforts were enhanced by special funding from The Nature Conservancy for research and inventory on Connecticut and Deerfield River valley habitats. We received 45 proposals encompassing state-wide interests and were pleased to fund 29 of them with a budget of \$45,192.

Vertebrate research studied Southern Bog Lemmings, Blanding's Turtles, Cliff Swallows, two projects monitoring Piping Plovers, and herpetological surveys of Mt. Toby and the Holyoke Range.

Botanical surveys were conducted for Adder's-tongue Fern, coastal plain spikerushes, rare plants of beaches and dunes, and rare plants of Berkshire County. A study into the biology and reproductive ecology of Britton's Violet continued for a second year.

Our understanding of rare invertebrates will improve with the final results of projects carried out on two federally listed tiger beetles, spider diversity on Cape Cod, and the dragonflies and damselflies of Martha's Vineyard. Three inventories were conducted for the moths of Pitch Pine/ Scrub Oak habitats, one of which also looked at ants.

Studies of the Connecticut and Deerfield River valleys included: plant indicator species of Old-growth Forests, riverine dragonflies, mayflies, stoneflies, caddisflies, aquatic beetles, and two natural community surveys.

Final results of all these projects will be added to our database to increase our understanding of rare species and the natural heritage of the state. We hope to share these results in a future newsletter.

Environmental Reviews

If a Massachusetts home owner wants to build a deck near an important marshland or the EPA wants advice on evaluating hazardous waste sites in the state, if the Mass. Dept. of Environmental Protection considers a new site for solid waste or the U.S. Army Corps of Engineers reviews a project involving surface water, then a request for information is certain to reach either Jay Copeland (Environmental Reviewer) or Steven Roble (Wetlands Wildlife Biologist). About 750 of the inquiries received each year need individual, written responses. In addition, Mr. Copeland scans roughly 600 Environmental Notification Forms in the Environmental Monitor published by the MEPA office. Using this forum, he submits comments on projects that may impact rare plants, animals, or other elements of the state's biodiversity. Nearly 1,500 projects a year are given varying amounts of consideration by NHESP staff.

The bulk of environmental reviews are wetlands related and take the form of Appendix A filings. An Appendix A is required for those wetland projects located within an Estimated Habitat area shown on the publicly available Atlas of Estimated Habitats of Rare Wetlands Wildlife prepared by the NHESP. If a listed* wetland animal is found to be within the area proposed for alteration then the project warrants close review. According to wetlands regulations, the Program's recommendations in these cases are "presumed correct" by town conservation commissions.

Any environmental review request sent to our office should include a description of the proposed activity, a locus map using a USGS topographic map, and should indicate the type of review sought (wetland, MEPA, etc.). To discourage improper collecting or harming of protected species, identification of individual species at a given site is provided on a need-to-know basis. This information will not be released without a specific request.

-Christine Dugan

*Endangered, Threatened or Special Concern

Observers Find Rare Plants



Amateur naturalists and biologists from outside the Program occasionally assist NHESP staff in locating populations of rare species. Two recent rediscoveries highlight this relationship.

In the summer of 1990 Jerry Shampang, a skilled laborer on DFW's western district wildlife crew, noticed a plant in Huntington that he had never seen before. He showed it to Bruce Sorrie, Program Botanist, who quickly identified it as **Wild Senna** (*Cassia hebecarpa*). This was the first time that this species had been documented in the state since 1934. Although we later learned of another sighting in 1977, this summer's attempts to re-locate that population were unsuccessful. We have recently proposed that this species be state-listed as Endangered.

Wild Senna blooms in July and August. Its yellow flowers are small, just 3/4 of an inch long, and are arranged in racemes (clusters of flowers along stems and atop the plant). Its compound leaves are pinnate (divided or lobed along a midrib), and the hairy pods of this legume are as long as they are wide.

If not for Pamela Weatherbee's keen eye, we would not know that the Endangered **Braun's Holly-fern** (*Polystichum braunii*) can still be found in Massachusetts. In 1982 she documented its first occurrence here since 1922. This summer, while at work updating Ralph Hoffmann's Flora of Berkshire County, she (and Wayne Petersen of the Mass. Audubon Society) found another four plants. We know of only four locations in the state for this species, three of them consisting of just one individual plant. All are found on Mt. Greylock.

The fronds of this evergreen fern are scaly, clustered, and may reach two feet in length. A plant will have between 25 and 40 pinnules (primary divisions of fronds), each with one lobe at the base. This species prefers high-elevation Hardwood/Coniferous forests on talus slopes, rocky ravines, and stream banks.

-Christine Dugan

Nature Preserves Council Established

Massachusetts joined at least 12 other states in forming a state nature preserve system when the enabling legislation was signed in January 1990. This system is designed to protect the most ecologically important natural communities (see related story on p. 4) existing on state-owned land. According to the statute, a nature preserve is:

an area of land that: (i) retains or has recovered to a substantial degree its natural or primeval character, provided, however, that it need not be completely undisturbed; (ii) has native floral, faunal or ecological features of scientific or educational interest; or (iii) is necessary for the protection of land so described.

Mary Wakefield, a private citizen, actively promoted passage of the new law.

Nature Preserves Council members are appointed by the Secretary of the Executive Office of Environmental Affairs and have three duties: advising state agencies on policies and regulations concerning nature preserves, reviewing nominations of potential sites, and assisting with the preparation of protection plans (e.g., trail layouts and control of non-native species) for each site. The Council, meeting monthly since April 1990, began by drafting regulations to implement the new law. These regulations are now under final review. The Council's next priority will be screening future sites to be included in the system.

Members

Tim Simmons, Chair (The Nature Conservancy)
 Jeanne Anderson (Mass. Audubon Soc.)
 Kathleen Anderson (Manomet Bird Observatory, retired)
 C. Barre Hellquist (No. Adams St. College)
 Gwilym Jones (Northeastern University)
 Paul Kress (Mass. Wildlife Federation)
 Doug Smith (Univ. of Mass., Amherst)

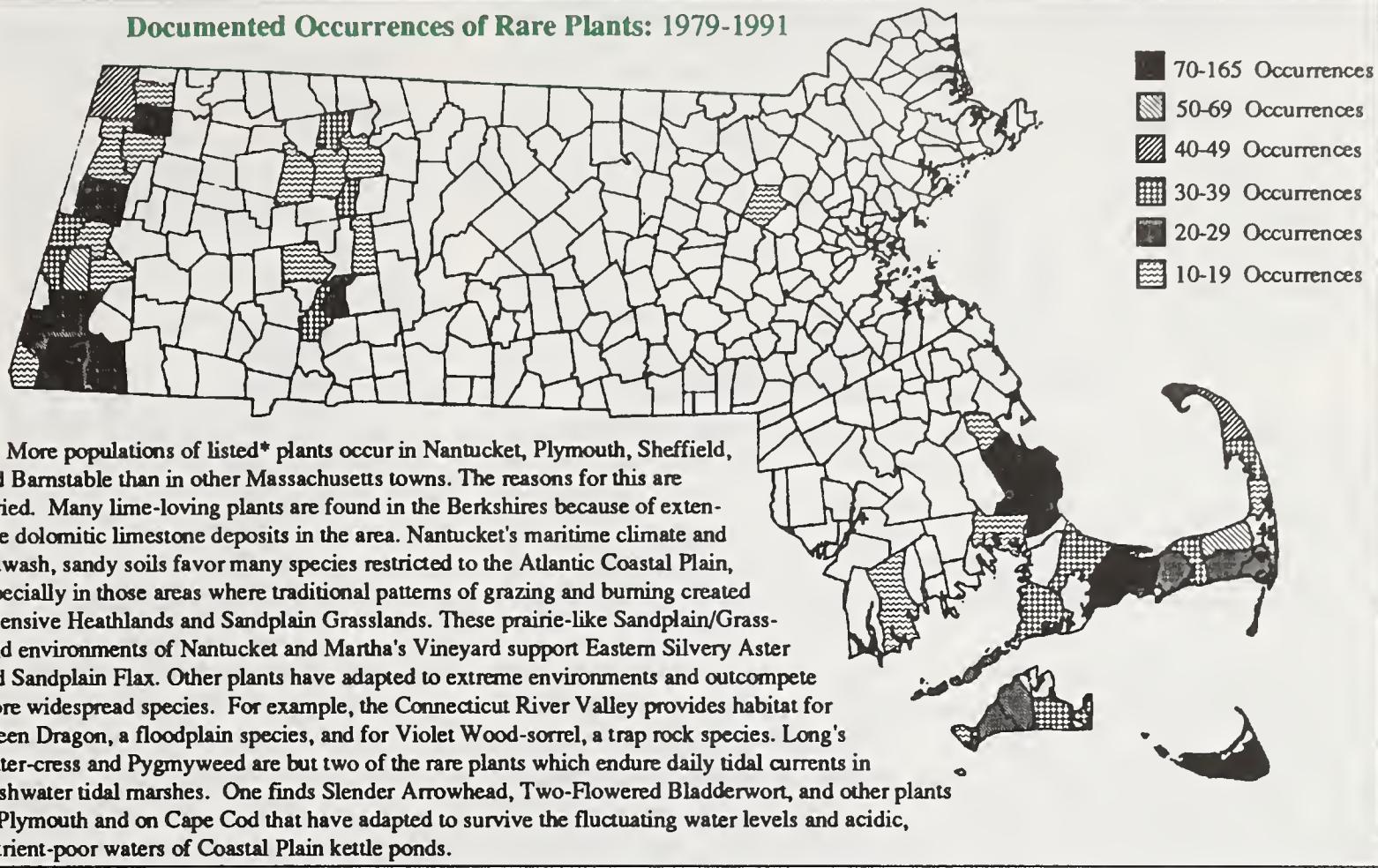
State Agency Associate Members

Marcy Beitel (MDC - Reservations & Historic Sites)
 Stephen Johnson (Executive Office of Environmental Affairs)
 Andrea Lukens (Dept. of Environmental Management)
 Robert O'Connor (MDC - Watersheds)
 Patricia Swain, Secretary to NPC (NHESP)

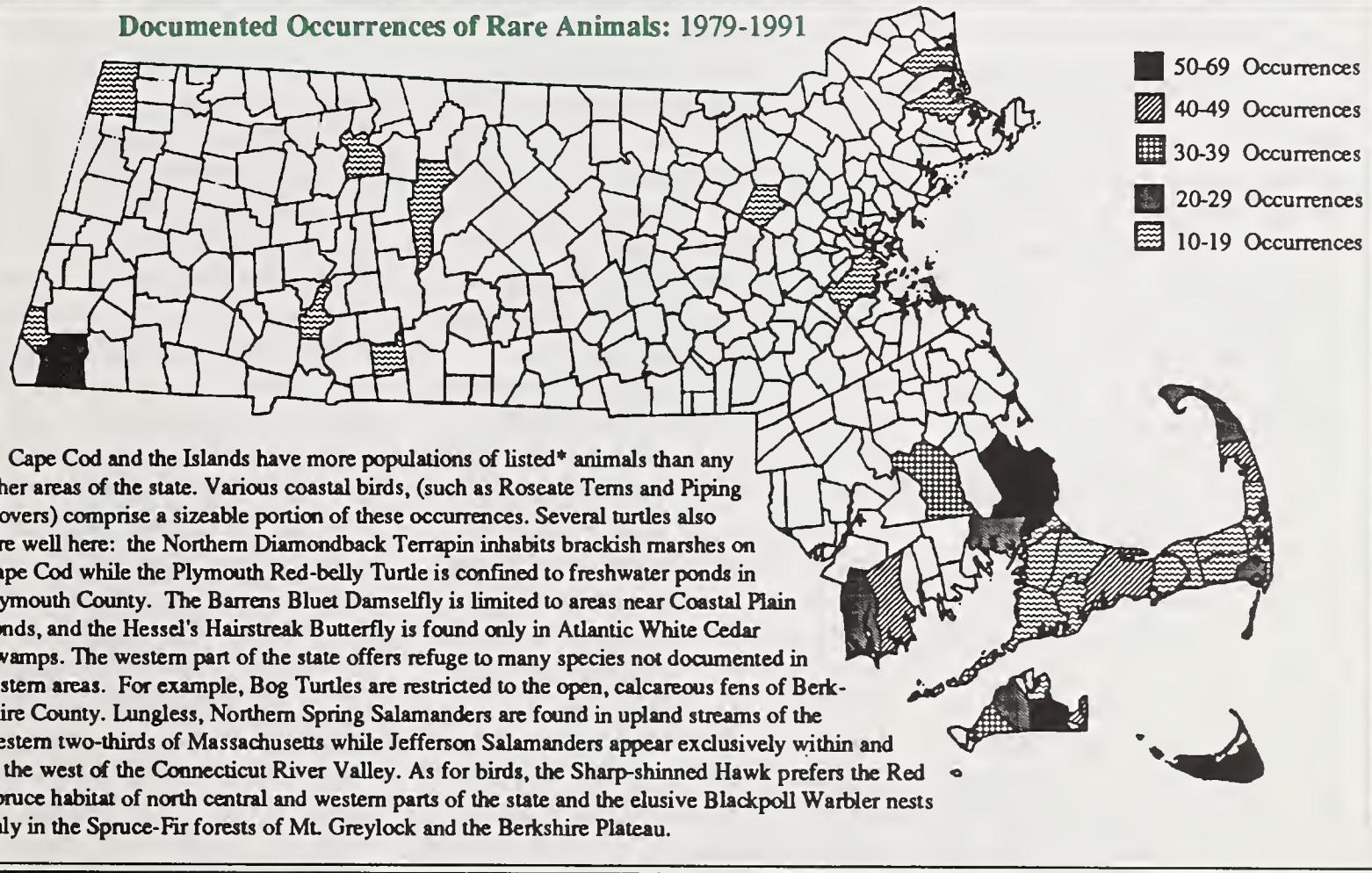
-Christine Dugan

Rare Species in Massachusetts: A Town-by-Town Breakdown From the NHESP Database

Documented Occurrences of Rare Plants: 1979-1991



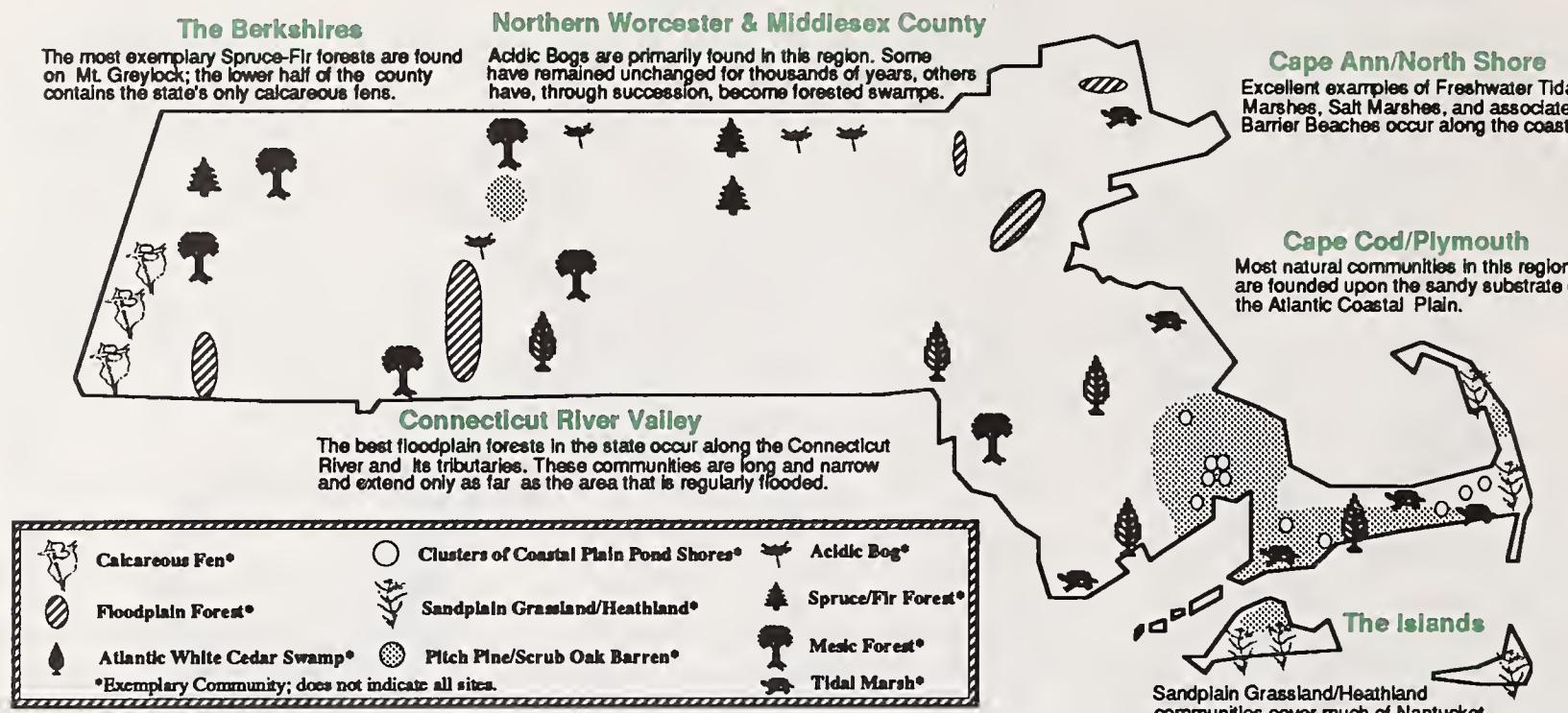
Documented Occurrences of Rare Animals: 1979-1991



* Listed as Endangered, Threatened or Special Concern by MA Division of Fisheries & Wildlife

- Christine Dugan

Natural Communities: A Look at Some of the Rarer Types and Where They Occur



Natural communities are groups of native plants and animals that occur together naturally and that maintain complex interrelationships. The NHESP recognizes approximately 85 natural community types in Massachusetts. According to current research, Calcareous Basin Fens, Sandplain Grasslands/Heathlands, and High Elevation Spruce/Fir Forests are among the rarest types in the state. Preserving some of these habitats is an important component of the new Nature Preserves System (see related story on p. 2). Program staff develop protection plans with managers of land containing important natural communities. In addition, we maintain records of rare species found in exemplary communities and continue to inventory additional sites.

Climate, geology, and topography contribute to the clustering of specific community types in localized regions, as depicted above. The following habitat descriptions are excerpted from our Natural Community Fact Sheets:

Acidic Bogs contain floating mats of sphagnum moss, sedges, and shrubs that grow out over water. The plants are largely insulated from groundwater influence, receiving water and nutrients mainly from precipitation. These bogs maintain carnivorous plants (pitcher plants, sundews, and bladderworts) that

digest insects and other invertebrates to supplement their nutrient intake.

Atlantic White Cedar Swamps are freshwater wetland communities. They are composed of nearly pure stands of Atlantic White Cedar. Red Maple is the main co-dominant species but Red Spruce and Blackgum may grow here as well. The rare Hessel's Hairstreak butterfly is found only here.

Calcareous Fens are open, peaty wetlands with cold, alkaline groundwater that flows out from a calcareous mineral substrate. They support a diverse assemblage of plants dominated by lime-loving sedges, grasses, herbs, and shrubs. At least 30 state-listed* rare plant and animal species occur here -- a disproportionately high number.

Floodplain Forests develop next to rivers and streams that flood regularly in the spring. If undisturbed, they support a diversity of plants and animals, protect the quality of water in adjacent streams by buffering streams from upland uses, and store floodwater. Silver Maple, Black Willow, Sycamore, Cottonwood, Green Ash, and American Elm are the most common trees.

Freshwater Tidal Marshes occur along rivers near the coast. Although the water in them rises and falls with the tide, saltwater never reaches them. Rare plants found here include River Arrow-

head, Long's Bitter-Cress, and Parker's Pipewort. Snakes, turtles, and insects are more diverse in freshwater marshes than in saltwater ones.

Mesic Forests are dominated by hardwoods such as Sugar Maple, White Ash, Beech, Red Oak, and Yellow Birch. They occur more commonly in the western part of the state where the soil is less acidic. Nodding Pogonia, Black Cohosh, and Ginseng are a few of the listed* plants found here.

Pitch Pine/Scrub Oak Barrens are tree and shrub communities on glacial outwash sandplains. They typically have an open canopy of Pitch Pine and a nearly impenetrable understory of Scrub Oak and Huckleberry.

Sandplain Grasslands/Heathlands are open, treeless communities of dry, sandy soils derived from glacial outwash deposits. Like Pine Barrens, they are mainly restricted to Cape Cod and the Islands. Approximately 15 state-listed* species may be found here.

Spruce/Fir Forests appear in high elevation areas, such as the Berkshires and Mt. Wachusett. Due to strong winds, heavy snows, and low nutrient availability, the trees are often stunted, growing only 15-30 feet tall. Blackpoll Warblers and Mourning Warblers, both state-listed* birds, are found in this habitat.

Natural Communities: Coastal Plain Pond Shores

First in a series.

Coastal Plain Pond Shore communities are a global rarity. We are fortunate to have numerous examples of this community in Massachusetts. Here they occur primarily in sandy substrate and kettle hole topography on Cape Cod and southern Plymouth County. (Kettle ponds were formed when ice was buried under sand and gravel during the Ice Age and later melted, leaving a hole in the ground.) These ponds are the top of the underground aquifer. (Grasses and herbaceous plants constitute the resulting plant communities growing on the exposed margins of the ponds.) There are several ponds on outwash plains in the southern Connecticut River Valley that function similarly but which support fewer species.

This particular type of community includes a reservoir of globally restricted plants. Although some may be locally abundant, many species found here seldom occur elsewhere; Plymouth gentian (*Sabatia kennedyana*) is one example. Plants of this community appear to form concentric zones between the water and the shrubs around the pond. Small shrubs are found above the high water line, an intermediate area of beach provides habitat for most species of the community, and aquatic plants grow in the submerged or water-saturated area.

Water moves easily through the sandy substrate, thus the water level rises and falls with the water table through the seasons. Many of the plant

species of the community are able to start growth from seed, perennial basal leaves, or roots while inundated with water in the spring; others may develop only when exposed. In wetter years the plants may grow vegetatively while submerged, with little flowering, or may not grow or germinate at all.

The waters of Coastal Plain ponds tend to be nutrient poor and acidic. Plants of the pond shore community are particularly adapted to these conditions and are often limited to this environment. While they are successful here, they may be unable to compete with other widespread plants that require more nutrients. The periodic inundations of the shore also help to keep out shrubs and upland plants, and the periodic drying keeps out the obligate (unique to one environment) aquatic plants. Only one year in about five may be dry enough for the community to develop fully. The natural lowering of water levels during the growing season is probably the single most important factor in providing suitable habitat for the plants of the pond shore community.

Damselflies

The Lateral Bluet and the Barrens
Bluet damselflies are two rare semi-aquatic insects that are part of Coastal Plain Pond Shore communities. The latter, in fact, is found only near these ponds. Both species perch upon

emergent vegetation near the shore. Damselflies need a permanent body of water to successfully reproduce. Eggs are laid in vegetation in late spring, then the nymphs prey on aquatic invertebrates during summer months. After overwintering in the water the nymphs crawl onto land during the following spring and transform into adults. Adults produce only one generation and will die shortly after mating.

Threats

Coastal Plain Pond Shore communities face several immediate and long-term threats posed by human disturbance. The community requires natural fluctuation of the water levels along the shore but these levels are often tampered with for human use. Artificially maintained high water levels (e.g., for cranberry bogs or recreation) reduce the area of shore available for the pond shore community. Most of the plants can withstand high water for a few years, but many need to be out of water to reproduce. Excessive pumping for water consumption reduces natural fluctuations and allows woody species to advance down the shores. Human use of the pond shores, including heavy foot traffic, off-road vehicles, and beach building restricts plant growth. In areas of heavy use, the plants can easily be eliminated. Finally, high nutrient leachate from improperly maintained septic systems poses the long-term threat of pond eutrophication.

- Patricia Swain

Schematic Cross-section of a Coastal Plain Pond Shore Community

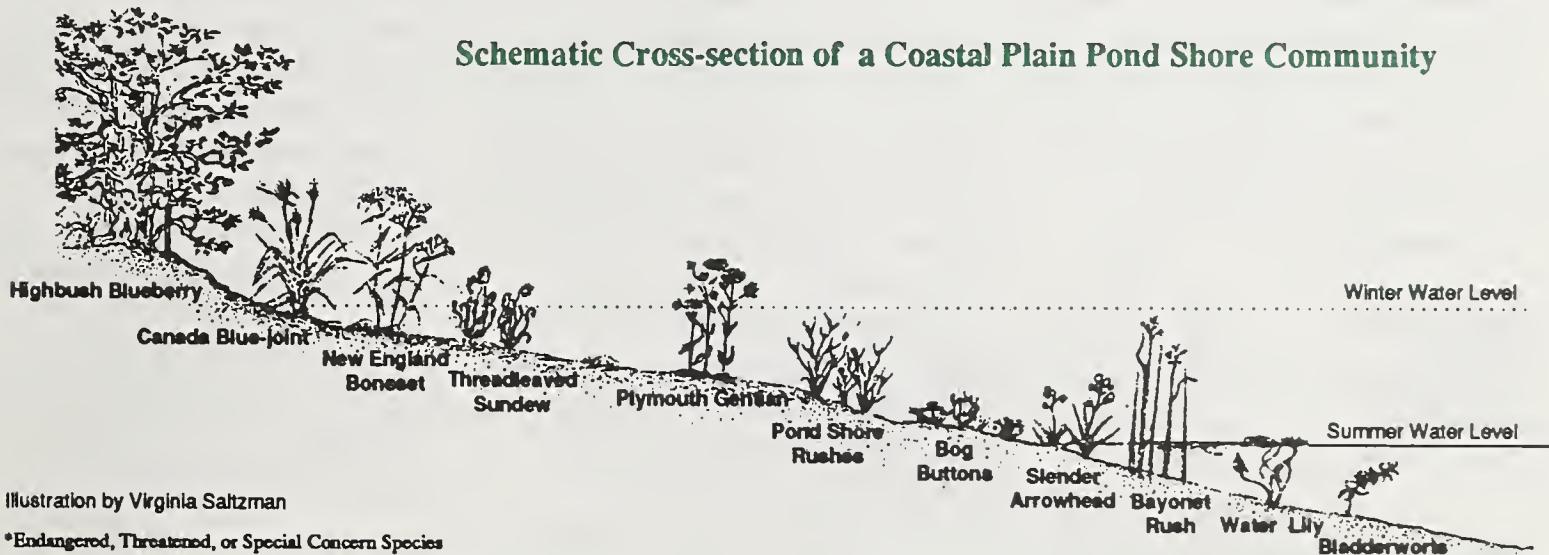


Illustration by Virginia Saltzman

*Endangered, Threatened, or Special Concern Species



Terns

About nine species of terns visit the state each year but only four remain to nest. They include the Roseate Tern (state and federally Endangered) and Arctic, Common, and Least Terns (state-listed Special Concern species). In addition, one pair of Forster's Tern (*Sterna forsteri*) nested on Plum Island this year. This is the first documented nesting pair ever recorded in the state.

Terns face natural hazards such as erosion, flooding, and alteration of nesting substrates as well as the risks of predation and human disturbance of nesting areas. In addition, Roseate Terns have been forced out of traditional nesting areas by increasing numbers of Herring and Great Black-backed Gulls.

State Ornithologist Brad Blodget has been active in efforts to protect Terns since 1977. Two years ago he helped to prepare the Roseate Tern Recovery Plan. The goal of this federal plan is to increase the number of nesting pairs in the Northeast to 5,000. Since 1977, annual censuses have documented between 1,400 and 2,200 nesting pairs in Massachusetts, although the range is usually between 1,600 and 1,900 pairs.

Restoring former nesting areas is the most critical element of the recovery plan and will, ultimately, be the measure of the program's success. Given that 98% of Roseate Terns in the state nest on just one island, an increase in their numbers is not thought to be possible without re-establishing additional nesting areas. This summer, for the first time since 1973, a small number of Roseate Terns visited Ram Island (a former nesting site). The birds were lured there through the recovery team's efforts and Mr. Blodget is warily optimistic about their future.

Number of Pairs	1982	1991
Arctic Terns	23	11
Common Terns	7,577	9,822
Least Terns	1,812	2,381
Roseate Terns	1,986	1,766

-Christine Dugan

* Endangered, Threatened or Special Concern species

Endangered Species

Regulations

(Cont'd from p. 1)

provisions. One particularly noteworthy feature of both the statute and regulations is that, for the first time, rare plants are provided with protection similar to that of animals. Another element of the new regulations is that state agencies are advised to "use all practicable means and measures to avoid or minimize damage" to listed* species.

Although an important component of the act, it should be noted that habitat protection is implemented on a site by site basis after a public hearing process. Areas can be designated as Significant Habitat that contain "physical or ecological features important to the conservation of a Threatened or Endangered species population and which may require special management considerations and protection". The Natural Heritage & Endangered Species Program has calculated that the habitat protection provisions of this act could only apply, at most, to one-seventh of one percent of the privately-held, unprotected developable land of the Commonwealth. This represents a maximum of about 7,500 acres. (The case by case delineation and designation of Significant Habitat is very different, and entirely independent, from the more encompassing estimated habitats for rare wetlands wildlife currently utilized under the state's Wetlands Protection regulations.)

The Division of Fisheries & Wildlife held two public hearings on the regulations in late September. After a review by the legislature's Committee on Natural Resources and Agriculture, the Fisheries & Wildlife Board will vote on the adoption of the regulations on December 30 and, if approved, will become effective in January 1992.

Copies of the public review draft of the regulations are available from the NHESP. Once promulgated, the final regulations will be available from the State House bookstore.

-Henry Woolsey

Methods Established to Study Secretive Birds



Studying secretive birds is a specialty for Rare Species Zoologist Scott Melvin. He began studies of survey methods for wetland birds and their habitats while working for the Maine Dept. of Fish and Wildlife in 1989 and 1990. During May and June of this year he continued this research by beginning a two-year study of wetland birds in western Massachusetts. Five of the 11 species being studied are state-listed as Threatened (Pied-billed Grebe, Least Bittern, King Rail) or Special Concern species (American Bittern and Common Moorhen).

Wetland birds tend to be obscured by tall marsh vegetation and often will not appear as openly or vocalize as frequently as other birds might. Dr. Melvin stresses the need to standardize methods for monitoring the abundance and distribution of wetland birds and the status of their habitats.

Fieldwork for this study is being conducted by Shawn Crowley, a graduate student in the Dept. of Forestry and Wildlife Management at the University of Massachusetts-Amherst. During May and June, Shawn visited 40 wetlands in western Massachusetts, returning three times to each wetland. By playing tape recorded calls he was able to increase detection rates for several species and gather data on response behavior and habitat preferences. Analysis of 1991 findings is underway; next year's work will focus on wetlands in eastern and southeastern Massachusetts.

This research is being undertaken jointly by the Massachusetts Division of Fisheries and Wildlife and the University of Massachusetts-Amherst, and is funded in part by the U.S. Fish and Wildlife Service.



-Christine Dugan

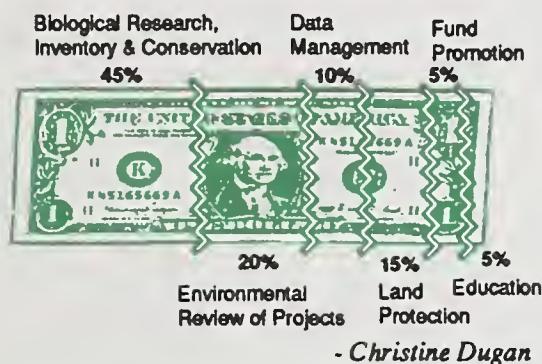
Voluntary Contributions On State Income Tax Forms Down



*Incomplete figure based on approximately 75% of returns processed thus far.

Contributions from 1990 individual state income tax forms to the NHES Fund appear to be down about 8%, totaling \$286,600 thus far. We speculate that both the recession and the increasing numbers of "check-offs" now appearing on the forms are largely responsible for this year's decline. Since 84% of our budget is funded from donations on these tax forms, the Program could be severely impacted by this decreasing trend. As depicted in the above graph, 1990 is approaching the median for annual contributions. The voluntary contribution line to the Fund first appeared on individual state tax forms in 1983 and on corporate tax forms in 1990.

How a Contributed Dollar is Spent:



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NEWS NOTES



Two pairs of **Peregrine Falcons** returned to their traditional sites in Boston and Springfield. Five chicks were fledged but three were later killed by windows or airplanes.

Of the nine territorial pairs of **Common Loons** documented in the state this year, six were found at Quabbin Reservoir. Eight chicks fledged this summer; seven fledged in 1990.

In an attempt to increase the population of **Endangered Plymouth Red-belly Turtles**, the NHESP has worked with other institutions and volunteers on a "head starting" project. During the last 7 years, over 600 hatchlings have been raised by cooperating institutions. This past summer the DFW team released 62 head-started hatchlings at 7 sites. The global population of these turtles is now estimated to total 900 individuals.

NHESP researchers who initiated an **American Burying Beetle** recovery plan in the summer of 1990 believe that progress has been made in re-establishing a third population of the beetle. Last July they found 16 individuals, all hatched the previous fall, that had survived the winter. Later, additional adults were introduced, giving the island a population of at least 19 pairs to continue the recovery.



Six **Bald Eagle** pairs were found in the state this year; four nested and two were territorial. Of the six chicks that hatched, one was lost to predation and one to bad weather.



Northeastern Bulrush (*Scirpus aciculatus*), which was rediscovered in Massachusetts in 1989, was federally listed as **Endangered** in June and has been recently proposed as state **Endangered**. There are just 13 known sites for this plant across the country.

- Christine Dugan

PUBLICATIONS

Dragonflies and Damselflies of Cape Cod, by Virginia Carpenter, is newly available. Her fieldwork was partly funded by the NHESP from 1985-1990. Copies may be obtained by sending a check for \$11.45, payable to the Cape Cod Museum of Natural History, to: Jim Pavia, Drawer R, Cape Cod Museum of Natural History, Route 6A, Brewster, MA 02631.



Glenn Motzkin's report, **Atlantic White Cedar Wetlands of Massachusetts**, was published in March. This work was supported in part by NHESP funding. Copies may be obtained by sending a check for \$10.00, payable to the University of Massachusetts, to: Bulletin Center, Cottage A, University of Massachusetts, Amherst, MA 01002.



Save something on your taxes.

Contributions to the NHES Fund are usually made on state income tax forms and are deductible on federal tax forms.



Or, you can donate directly to the Fund with a personal check. Please accept my contribution of \$_____ . Please make checks payable to "Natural Heritage & Endangered Species Fund".

Bruce Sorrie To Survey Longleaf Pine Forests in North Carolina

Bruce Sorrie, Program Botanist since 1979, is now enjoying the botanical abundance and more temperate climate of North Carolina. On October 1 he began work on a two year contract with The Nature Conservancy to inventory plants found within the Sandhills Longleaf Pine Forests of Fort Bragg Army Base. Bruce's departure is both a great personal and professional loss for the Program. Some of his contributions to the Program include: refining the state's list of Endangered, Threatened or Special Concern plant species, finding or confirming over 70% of the plant occurrences in our database, and rediscovering Sandplain Gerardia (*Agalinis acuta*), a plant thought to have been extinct since 1944. We will miss him as a botanist, photographer, ornithologist, and friend but wish him success as he joins former Massachusetts botanist Richard LeBlond in exploring North Carolina's natural heritage.

Other Staff Changes

After six years as the Program's habitat protection specialist, Annie Woolsey left the Program in April to care for her new son Patrick. It will be difficult to replace the energy and enthusiasm she contributed to her work with the Natural Heritage Areas Registry as she contacted land managers about rare species sites on public land and assisted them in their protection efforts... Meg Goodwin left the Program in May to pursue an MBA at Pennsylvania State University. She had been Manager of Information Systems for three years, during which time she cheerfully pioneered the use of the Program's data in the state's Geographic Information System... Gretchen Eliason, a Boston University work-study student with the Program for four years, assumed Meg's position in June.

Rare Species List Changes; Information Sought on the Spotted Turtle

As part of its review process, the NHESP has consulted with biologists to verify the status of species on the list of Endangered, Threatened, and Special Concern plants and animals in the state. 21 changes have been proposed to the list this year, including 16 additions, 4 deletions, and 1 change in status. While we have a number of Spotted Turtle (*Clemmys guttata*) records, it became clear during this process that we need more information on this species before we can accurately determine its status. Please report any sightings of this turtle to our office. We would appreciate any photographs and information on the age (report shell length), sex, and local population status of these turtles if possible.



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Carl Prescott	Deputy Director, Field Operations

NHES PROGRAM STAFF:

Thomas French	Assistant Director for Natural Heritage & Endangered Species
Henry Woolsey	Coordinator, Natural Heritage & Endangered Species Program
Brad Blodget	State Ornithologist (Westboro Office)
Jay Copeland	Environmental Reviewer
Bill Davis	Eagle Project Leader (Westboro Office)
Gretchen Ellason	Manager of Information Systems
Scott Melvin	Rare Species Zoologist (Westboro Office)
Steven Roble	Wetlands Wildlife Biologist
Patricia Swain (Vacant)	Natural Community Ecologist
	State Botanist

The Program also relies upon interns, volunteers, and work-study students for crucial assistance:

Christine Dugan	Intern, Newsletter Writer/Editor
Mark Henderson	Intern, Wetlands Wildlife Atlas
Patricia Huckery-Tower	Intern, Environmental Review
Diane Lazinsky	Volunteer, Animal Fact Sheets
Kelly Slater	Intern, Plant Fact Sheets
Kevin Wong	Intern, Data Handling

We wish to thank Dave Gabriel, DFW Graphic Artist, for his technical support in the production of this newsletter.



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